



Far-IR Science Interest Group Meeting Introductory Remarks

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With thanks ...



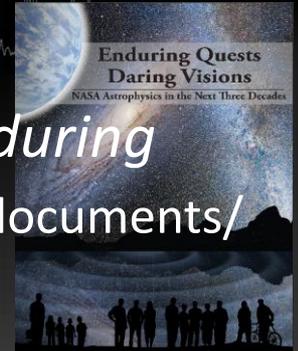
- ◆ to my co-organizer and friend, Paul Goldsmith.
- ◆ to the presenters for providing food for thought.
- ◆ to all of you for participating.

- ◆ Why are we here?
 - Planning for the next Decadal Survey
 - Opportunity: the “Far-IR Surveyor” in NASA’s Astrophysics Roadmap
- ◆ Recent, ongoing, and upcoming activities
 - Far-IR community workshop, May 2014
 - May workshop follow-up: continuing study
 - Conferences of interest
- ◆ “Why are we here?” – the “killer app”

- ◆ All three Astrophysics PAGs will be asked by NASA to recommend large missions for study
 - Aim is to prepare ~3 - 4 concepts for consideration in the next Decadal Survey
 - “Large” means total mission cost >\$1B
 - Candidate mission concepts from
 - 2010 Decadal Survey
 - NASA Astrophysics Roadmap (2014)
 - One or two missions to be recommended per PAG
 - PAG recommendations (reports) due by fall 2015
 - NASA to commission STDs (open competition) and make strategic investments in technology
- ◆ Details in white paper at <http://science.nasa.gov/astrophysics/documents/>

- ◆ The COPAG could recommend the “Far-IR Surveyor” mission for study
- ◆ ... but only if the community wants it to happen
 - Don’t take this for granted!
 - Advocacy starts here and now, with you

The “Far-IR Surveyor”



- ◆ Name comes from the NASA Astrophysics Roadmap, *Enduring Quests, Daring Visions*, <http://science.nasa.gov/astrophysics/documents/>
- ◆ Vision for the mission, according to the Roadmap:
 - New start in the 2020s
 - “pioneer space interferometry to resolve protoplanetary disks”
 - “directly measure water emission lines from young stellar systems identified by ALMA and JWST”; “detect the distribution and flow of water”
 - “provide critical information on the chemical and dynamical evolution of [the first stars and protogalaxies]”
 - Relative to *Herschel*,
 - **Cool telescope to ~4 K** to gain 3 orders of magnitude in sensitivity
 - Enhance spectroscopic capability – **integral field spectroscopy**
 - Use interferometry to attain **sub-arcsecond angular resolution**

Recent Activities



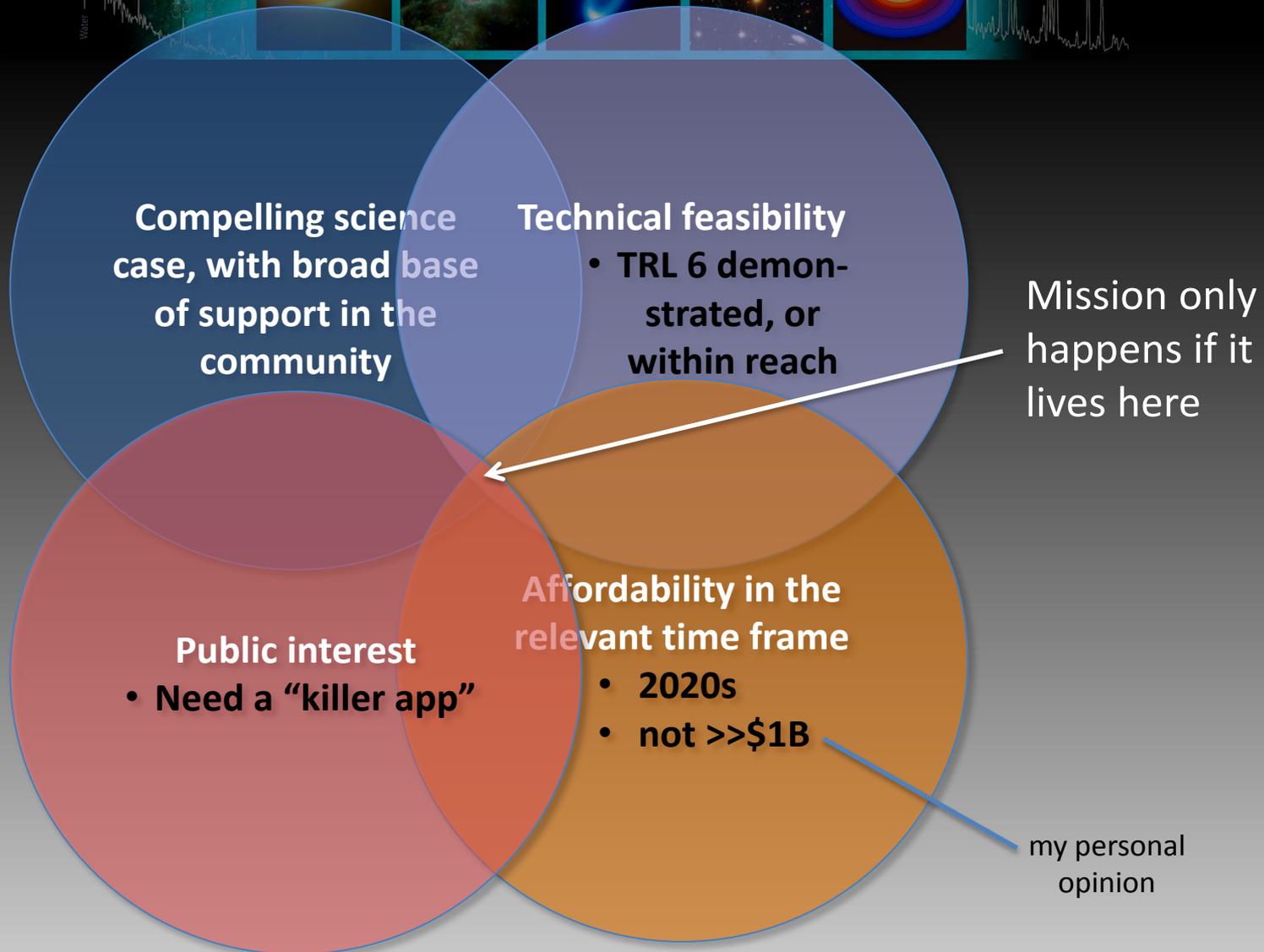
- ◆ “Sub-arcsecond far-infrared space observatory: a science imperative” submitted to ESA as L2/L3 white paper, May 2013, <http://www.firi.eu>
- ◆ Far-IR SIG approved by the NASA Astrophysics Subcommittee, November 2013
- ◆ “Science Goals of a Sub-arcsecond Far-Infrared Space Observatory,” Rome, 17-18 Feb, 2014, see <http://fisica.iaps.inaf.it/wp/>

- ◆ “Bringing Fundamental Astrophysical Processes Into Focus: A Community Workshop to Plan the Future of Far-Infrared Space Astrophysics,” Goddard, 12-13 May, 2014, <http://asd.gsfc.nasa.gov/conferences/FIR/>
- ◆ First Far-IR SIG meeting, Boston, 2 June, 2014
- ◆ JAXA-ESA SPICA mission bumped from ESA M4 to M5, under study at ESA

- ◆ Goddard workshop follow-up, with these study topics:
 - Assemble the community’s science objectives and measurement requirements into a Design Reference Mission, and conduct a Figure of Merit analysis of alternative far-IR mission concepts
 - Consider alternative “killer apps” for the mission, using the community as a sounding board
 - Conduct technical studies (technology SOA; LV options; feasibility and cost to meet sensitivity requirement with single aperture telescopes of different sizes)
 - Consider programmatic factors (SPICA; NASA budget)
- ◆ PAG and AAS meetings this week, inc. NASA Town Hall

- ◆ “Far-IR Space Interferometer Critical Assessment (FISICA) 2015 - Instrument Simulation and Preliminary Technology Development Activities,” Maynooth, Ireland, 28-29 Jan 2015, see <http://www.fisica2015.eu/>
- ◆ IAU General Assembly and Symposia, Honolulu, 3-14 Aug 2015, <http://astronomy2015.org/>
- ◆ “Pathways towards habitable planets,” Bern, Switzerland, 13-17 July 2015, <http://pathways2015.sciencesconf.org/>
- ◆ SPIE “UV/Optical/IR Space Telescope and Instruments: Innovative Technologies and Concepts VII,” San Diego, 8-13 Aug 2015, <http://spie.org/x30491.xml>

Necessary Conditions for Large Mission Success



“Why are we here?”



- ◆ Need a “killer app” that conveys the essence of the mission’s science goals in words the public finds compelling
- ◆ Not necessarily one “killer app,” but a small number
- ◆ Major science themes for a future far-IR mission:
 - Planet formation and the emergence of habitable conditions
 - Galaxy formation and evolution – SF, AGN, mergers, feedback
- ◆ Maybe not “Why are we here?,” but perhaps “Why are there habitable planets?”
- ◆ Would like to hear *your* ideas

Many ways you can help ...



- ◆ Advocate for COPAG endorsement of the “Far-IR Surveyor” as one of two plausible COPAG-recommended large missions worthy of NASA study
- ◆ Participate in far-IR community workshops, SIG meetings, and studies
- ◆ Apply for membership in the far-IR mission STDT, if the opportunity arises; develop mission-enabling technology
- ◆ Invite cognoscenti to give talks in your department
- ◆ Become informed about concepts for future far-IR missions and their measurement capabilities
- ◆ Mention the importance of these capabilities in your research presentations – inspire the community